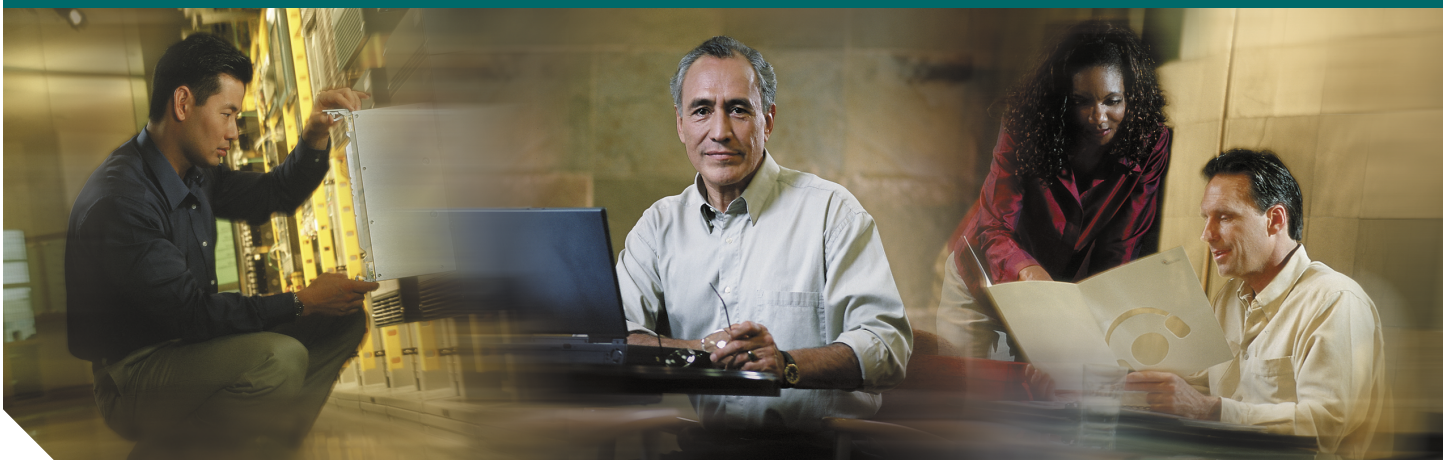
Quick Start Guide



Cisco 2800 Series Integrated Services Routers Quick Start Guide

INCLUDING LICENSE AND WARRANTY

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Revised: October 11, 2005, 78-16015-07

1 Cisco 90-Day Limited Hardware Warranty Terms

There are special terms applicable to your hardware warranty and various services that you can use during the warranty period. Your formal Warranty Statement, including the warranties and license agreements applicable to Cisco software, is available on Cisco.com. Follow these steps to access and download the *Cisco Information Packet* and your warranty and license agreements from Cisco.com.

1. Launch your browser, and go to this URL:

   http://www.cisco.com/univercd/cc/td/doc/es_inpck/cetrans.htm

   The Warranties and License Agreements page appears.
2. To read the Cisco Information Packet, follow these steps:
   a. Click the Information Packet Number field, and make sure that the part number 78-5235-03A0 is highlighted.
   b. Select the language in which you would like to read the document.
   c. Click Go.

      The Cisco Limited Warranty and Software License page from the Information Packet appears.
   d. Read the document online, or click the PDF icon to download and print the document in Adobe Portable Document Format (PDF).

      Note You must have Adobe Acrobat Reader to view and print PDF files. You can download the reader from Adobe's website, http://www.adobe.com.
3. To read translated and localized warranty information about your product, follow these steps:
   a. Enter this part number in the Warranty Document Number field:

      78-5236-01C0
   b. Select the language in which you would like to read the document.
   c. Click Go.

      The Cisco warranty page appears.
   d. Review the document online, or click the PDF icon to download and print the document in Adobe Portable Document Format (PDF).

You can also contact the Cisco service and support website for assistance:

http://www.cisco.com/en/US/support/

Duration of Hardware Warranty

Ninety (90) days.

Replacement, Repair, or Refund Policy for Hardware

Cisco or its service center will use commercially reasonable efforts to ship a replacement part within ten (10) working days after receipt of a Return Materials Authorization (RMA) request. Actual delivery times can vary, depending on the customer location.

Cisco reserves the right to refund the purchase price as its exclusive warranty remedy.

To Receive a Return Materials Authorization (RMA) Number

Contact the company from whom you purchased the product. If you purchased the product directly from Cisco, contact your Cisco Sales and Service Representative.

Complete the information below, and keep it for reference:

Company product purchased from	
Company telephone number	
Product model number	
Product serial number	
Maintenance contract number	

2 Overview

The Cisco 2800 series integrated services routers include the Cisco 2801, Cisco 2811, Cisco 2821, and Cisco 2851 routers. These routers differ as follows:

- Cisco 2801 routers support 2 HWIC/WIC/VIC/VWIC slots capable of supporting double-wide HWICs, 1 WIC/VWIC/VIC slot, 1 VWIC/VIC (voice only) slot, 2 advanced integration modules (AIM), 2 packet voice data modules (PVDMs), 2 Fast Ethernet connections, and 16 ports of IP phone power output.
- Cisco 2811 routers support 1 single network module enhanced (NME), 4 single or 2 double high-speed WAN interface cards (HWICs), 2 AIMs, 2 packet voice data modules (PVDMs), 2 Fast Ethernet connections, and 24 ports of IP phone power output.
- In Cisco 2821 routers, the network module slot adds support for a single network module enhanced extended (NME-X), and an additional slot supports an extension voice module (EVM); 3 PVDMs are supported; the LAN ports support 2 Gigabit Ethernet ports; and 36 ports of IP phone power output are available.
- In Cisco 2851 routers, the network module slot adds support for network module double-wide (NMDs) and network module enhanced extended double-wide (NME-XDs), and the IP phone power output is increased to 48 ports.

Note A high density extension module (HDEM) operates in the EVM slot on the Cisco 2821 and Cisco 2851 routers. The EVM slot supports additional voice services and density without consuming the network module slot on those routers.

This document provides the minimum necessary information to help you install the router, power it up, and configure a network connection. This document directs you to other documents for the following information:

- More detailed router installation instructions, descriptions, and specifications
- Procedures for installing modules, interface cards, power supplies, and memory

Note The interface numbering on Cisco 2800 series routers is different from the numbering on Cisco 2600 series routers. For more information on interface numbering, see the “Interface Numbering” section on page 30.

- Software configuration
- Regulatory compliance and safety information

Product Serial Number Location

You may need your product serial number when calling the Technical Assistance Center (TAC).

Figure 1 shows the serial number location for the Cisco 2801 router. The label is located on the rear of the chassis, at the bottom edge, near the lower left corner.

Figure 1 Serial Number Label Location for Cisco 2801 Router

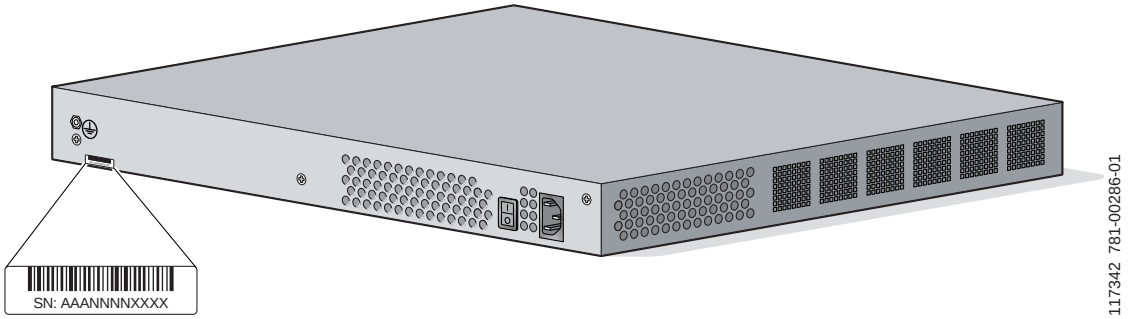


Figure 2 shows the serial number location for the Cisco 2811 router. The label is located on the rear of the chassis, near the top right corner, to the left of the CLEI label.

Figure 2 Serial Number Label Location for Cisco 2811 Router

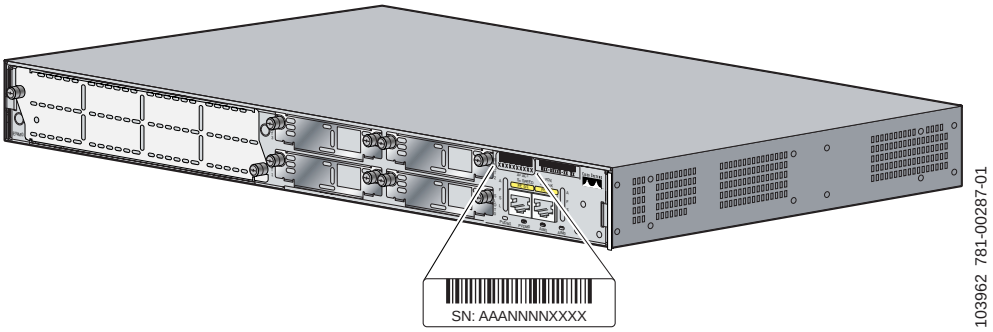
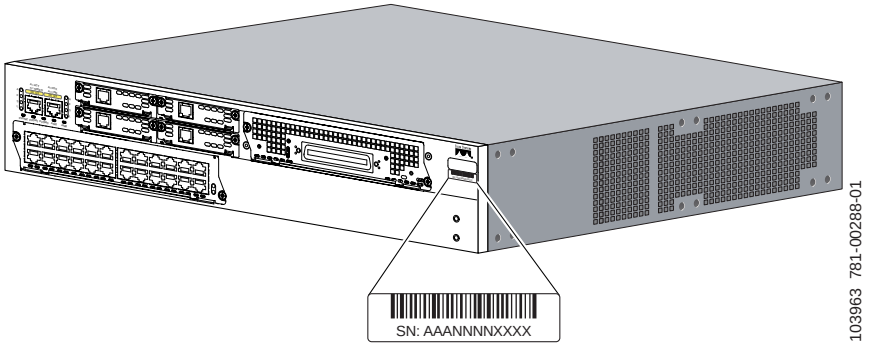


Figure 3 shows the serial number location for the Cisco 2821 router and the Cisco 2851 router. The label is located on the rear of the chassis, near the top right corner, below the CLEI label.

Figure 3 Serial Number Label Location for Cisco 2821 Router and Cisco 2851 Router



Cisco Product Identification Tool

The Cisco Product Identification (CPI) tool provides detailed illustrations and descriptions showing where to find serial number labels on Cisco products. It includes the following features:

- A search option that allows browsing for models using a tree-structured product hierarchy
- A search field on the final results page making it easier to look up multiple products
- Clear identification of end-of-sale products in results lists

The tool streamlines the process of locating serial number labels and identifying products. Serial number information expedites the entitlement process and is important for access to support services.

The Cisco Product Identification tool can be accessed at the following URL:

http://tools.cisco.com/Support/CPI/index.do

3 Documents, Equipment, and Tools

User Documentation

For complete platform documentation, see the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/2800/index.htm

All the documents referenced in this quick start guide are available on Cisco.com. See the "Where to Go Next" section on page 36. To view or print an online document in its original page format, click the PDF icon.

Translated Versions

Para obtener la versión en español de la Quick Start Guide (Guía rápida), visite la siguiente dirección:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/2800/qsg/index.htm

简体中文版的"快速入门指南"，请到下列链接：

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/2800/qsg/index.htm

Items Included with Cisco 2801 Routers

Your router package should include the following items in addition to the router:

- One blue RJ-45-to-DB-9 console cable; one DB-9-to-DB-25 modem adapter
- Power cord
- Cisco.com card; Cisco product registration card
- 19-inch (48.26-cm) rack-mount brackets with bracket screws
- Cable management bracket with one mounting screw
- Rubber chassis feet for desktop application
- *Cisco 2800 Series and Cisco 3800 Series Regulatory Compliance and Safety Information* document
- *Cisco Router and Security Device Manager (SDM) Quick Start Guide* document
- *Cisco 2800 Series Integrated Services Routers Quick Start Guide* (this document)

Items Included with Cisco 2811, Cisco 2821, and Cisco 2851 Routers

Your router package should include the following items in addition to the router:

- RJ-45-to-DB-9 console cable and RJ-45-to-DB-25 modem cable for management access
- Ground lug; AC power cord with AC-powered routers
- Cisco product registration card; Cisco.com card
- One pair of rack-mount brackets with screws for 19-inch racks
- Cable management bracket; optional 23-inch rack mount brackets, if ordered
- Ethernet cable for LAN interface
- *Cisco 2800 Series and Cisco 3800 Series Regulatory Compliance and Safety Information* document
- *Cisco Router and Security Device Manager (SDM) Quick Start Guide* document
- *Cisco 2800 Series Integrated Services Routers Quick Start Guide* (this document)

Items Not Included

Individual items in this list may be required for your installation:

- PC running terminal emulation software, or a modem for remote administrative access
- Cables for WAN interfaces, voice interfaces, additional LAN interfaces, or USB interface
- Cable ties, number 2 Phillips screwdriver
- Four screws for installing the router in a rack
- Other typical equipment, such as channel service unit/data service unit (CSU/DSU); NT1 device for ISDN-BRI S/T; Ethernet hub; USB devices

Note The onboard USB 1.1 ports support only Cisco-approved and qualified USB devices.

4 Install Chassis

This section contains basic installation procedures. For more detailed installation instructions, see the Cisco 2800 series hardware installation documentation at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/2800/hw/index.htm

Safety Information

The *Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information* document contains translations of the warnings that appear in this quick start guide.

For safety information you must know before working on your Cisco router, see the *Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information* document that accompanied this device.

Warning Definition

Warning **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.
Statement 1071

SAVE THESE INSTRUCTIONS

Waarschuwing **BELANGRIJKE VEILIGHEIDSINSTRUCTIES**

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Voor een vertaling van de waarschuwingen die in deze publicatie verschijnen, dient u de vertaalde veiligheidswaarschuwingen te raadplegen die bij dit apparaat worden geleverd.

Opmerking BEWAAR DEZE INSTRUCTIES.

Varoitus **TÄRKEITÄ TURVALLISUUTEEN LIITTYVIÄ OHJEITA**

Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. Tässä asiakirjassa esitettyjen varoitusten käännökset löydät laitteen mukana toimitetuista ohjeista.

Huomautus SÄILYTÄ NÄMÄ OHJEET

Attention **IMPORTANTES INFORMATIONS DE SÉCURITÉ**

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions d'avertissements figurant dans cette publication, consultez les consignes de sécurité traduites qui accompagnent cet appareil.

Remarque CONSERVEZ CES INFORMATIONS

Warnung **WICHTIGE SICHERHEITSANWEISUNGEN**

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewusst. Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise sind im Lieferumfang des Geräts enthalten.

Hinweis BEWAHREN SIE DIESE SICHERHEITSANWEISUNGEN AUF

Avvertenza **IMPORTANTI ISTRUZIONI SULLA SICUREZZA**

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Per le traduzioni delle avvertenze riportate in questo documento, vedere le avvertenze di sicurezza che accompagnano questo dispositivo.

Nota CONSERVARE QUESTE ISTRUZIONI

Advarsel **VIKTIGE SIKKERHETSINSTRUKSJONER**

Dette varselssymbolet betyr fare. Du befinner deg i en situasjon som kan forårsake personskade. Før du utfører arbeid med utstyret, bør du være oppmerksom på farene som er forbundet med elektriske kretssystemer, og du bør være kjent med vanlig praksis for å unngå ulykker. For å se oversettelser av advarslene i denne publikasjonen, se de oversatte sikkerhetsvarslene som følger med denne enheten.

Merk TA VARE PÅ DISSE INSTRUKSJONENE

Aviso **INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. O utilizador encontra-se numa situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha em atenção os perigos envolvidos no manuseamento de circuitos eléctricos e familiarize-se com as práticas habituais de prevenção de acidentes. Para ver traduções dos avisos incluídos nesta publicação, consulte os avisos de segurança traduzidos que acompanham este dispositivo.

Nota GUARDE ESTAS INSTRUÇÕES

¡Advertencia! **INSTRUCCIONES IMPORTANTES DE SEGURIDAD**

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Vea las traducciones de las advertencias que acompañan a este dispositivo.

Nota GUARDE ESTAS INSTRUCCIONES

Varning! **VIKTIGA SÄKERHETSANVISNINGAR**

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Se översättningarna av de varningsmeddelanden som finns i denna publikation, och se de översatta säkerhetsvarningarna som medföljer denna anordning.

OBS! SPARA DESSA ANVISNINGAR

Figyelem **FONTOS BIZTONSÁGI ELOÍRÁSOK**

Ez a figyelmezeto jel veszélyre utal. Sérülésveszélyt rejto helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján keresheto meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Предупреждение **ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ**

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ

警告 重要的安全性说明

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

警告 安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

주의 중요 안전 지침

이 경고 기호는 위험을 나타냅니다. 작업자가 신체 부상을 일으킬 수 있는 위험한 환경에 있습니다. 장비에 작업을 수행하기 전에 전기 회로와 관련된 위험을 숙지하고 표준 작업 관례를 숙지하여 사고를 방지하십시오. 각 경고의 마지막 부분에 있는 경고문 번호를 참조하여 이 장치와 함께 제공되는 번역된 안전 경고문에서 해당 번역문을 찾으십시오.

이 지시 사항을 보관하십시오.

Aviso **INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham o dispositivo.

GUARDE ESTAS INSTRUÇÕES

Advarsel

VIGTIGE SIKKERHEDSANVISNINGER

Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemesbeskadigelse. Før du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med denne enhed.

GEM DISSE ANVISNINGER

تحذير

إرشادات الأمان الهامة

يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض لإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالإجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في أخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز.
قم بحفظ هذه الإرشادات

Upozorenje

VAŽNE SIGURNOSNE NAPOMENE

Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se nalazi uz pojedino upozorenje pronaći i njegov prijevod.

SAČUVAJTE OVE UPUTE

Upozornění

DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY

Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení.

USCHOVEJTE TYTO POKYNY

Προειδοποίηση

ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ

Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνήθεις πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή.

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ

אזהרה

הוראות בטיחות חשובות

סימן אזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במעגלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כד לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה

Опомена

ВАЖНИ БЕЗБЕДНОСНИ НАПАТСТВИЈА
Симболот за предупредување значи опасност. Се наоѓате во ситуација што може да предизвика телесни повреди. Пред да работите со опремата, бидете свесни за ризикот што постои кај електричните кола и треба да ги познавате стандардните постапки за спречување на несреќни случаи. Искористете го бројот на изјавата што се наоѓа на крајот на секое предупредување за да го најдете неговиот период во преведените безбедносни предупредувања што се испорачани со уредот.
ЧУВАЈТЕ ГИ ОВИЕ НАПАТСТВИЈА

Ostrzeżenie

WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA

Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.

NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ

Upozornenie

DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY

Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu.

USCHOVAJTE SI TENTO NÁVOD

Warning **Before working on a system that has an on/off switch, turn OFF the power and unplug the power cord.** Statement 1

Warning **Read the installation instructions before connecting the system to the power source.** Statement 1004

Warning **This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.** Statement 1017

Warning **Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.** Statement 1029

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

Warning **To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules (such as power supplies, fans, or cards); these types of handles are not designed to support the weight of the unit.** Statement 1032

Warning **This equipment must be installed and maintained by service personnel as defined by AS/NZS 3260. Incorrectly connecting this equipment to a general-purpose outlet could be hazardous. The telecommunications lines must be disconnected 1) before unplugging the main power connector or 2) while the housing is open, or both.** Statement 1043

Warning **Ultimate disposal of this product should be handled according to all national laws and regulations.** Statement 1040

Warning **To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of 40 deg.** Statement 1047

Note This product requires surge protection to be provided as part of the building installation. To comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety, an external Surge Protective Device (SPD) is required at the AC power service equipment (see definition in the NEC).

Installing the Router

Note Cisco 2800 series routers are normally ordered with modules and interface cards. Before you remove or install any modules or interface cards, see the documents that accompany those items or to the online Cisco 2800 series hardware installation documentation at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/2800/hw/index.htm

For module and interface card compatibility information, see the data sheet for each module and interface card.

Warning **Before working on a system that has an on/off switch, turn OFF the power and unplug the power cord.** Statement 1

You can set any Cisco 2800 series router on a desktop or install it in a rack. A Cisco 2811 router can also be mounted on a wall or other flat surface. See the applicable instructions in the following sections.

- Rack-Mounting the Router, page 13
- Wall-Mounting the Router—Cisco 2811 Routers Only, page 16
- Installing the Router on a Desktop, page 17

Caution To prevent damage to the chassis, never attempt to lift or tilt the chassis by the plastic panel on the front. Always hold the chassis by the metal body.

Rack-Mounting the Router

Cisco 2811, Cisco 2821, and Cisco 2851 routers can be installed in 19- and 23-inch (48.26-cm and 58.42-cm) racks. Cisco 2801 routers can be installed only in 19-inch racks, and cannot be center mounted. Use the standard brackets for mounting the chassis in a 19-inch rack; use the optional larger brackets for mounting the chassis in a 23-inch rack.

You can mount the router in the following ways:

- Center mounting—Brackets attached in the center of the chassis with only the front panel facing forward
- Front mounting—Brackets attached at the front of the chassis with the front panel facing forward
- Rear mounting—Brackets attached at the rear of the chassis with the rear panel facing forward

The brackets are shown in Figure 4, Figure 5, and Figure 6.

Figure 4 Brackets for Rack-Mounting of Cisco 2801 Routers

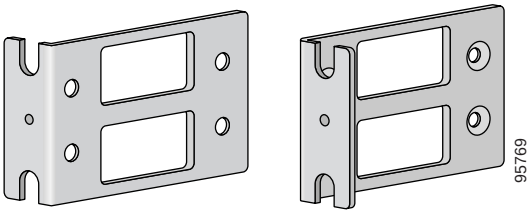


Figure 5 Brackets for Rack-Mounting of Cisco 2811 Routers

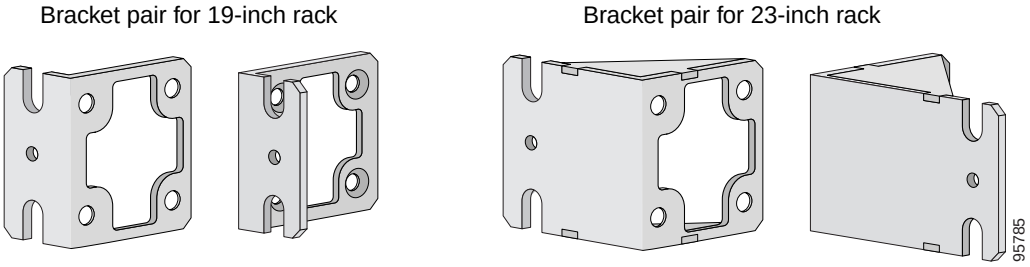
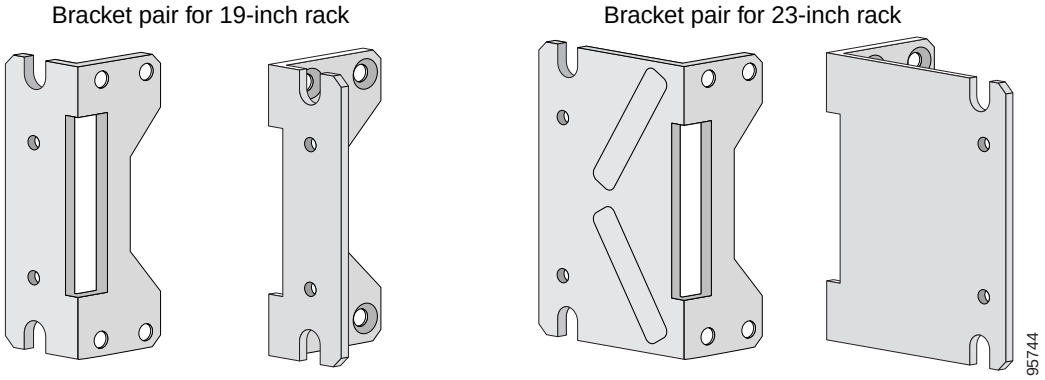


Figure 6 Brackets for Rack-Mounting of Cisco 2821 and Cisco 2851 Routers



Attaching Brackets to the Router for Rack-Mounting

Attach the mounting brackets to the router chassis as shown in Figure 7 through Figure 9, using the screws provided.

Caution Do not overtorque the screws. The recommended torque is 15–18 in-lb (1.7–2.0 N-m).

Attach the second bracket to the opposite side of the chassis. Use a number 2 Phillips screwdriver to install the bracket screws.

Caution Your chassis installation must allow unrestricted airflow for chassis cooling.

Figure 7 Bracket Installation for Front Mounting

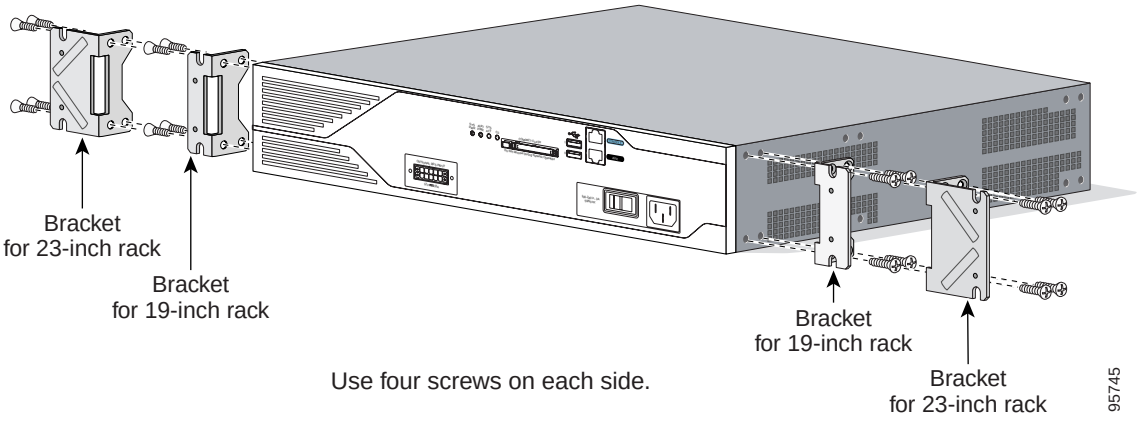


Figure 8 Bracket Installation for Rear Mounting

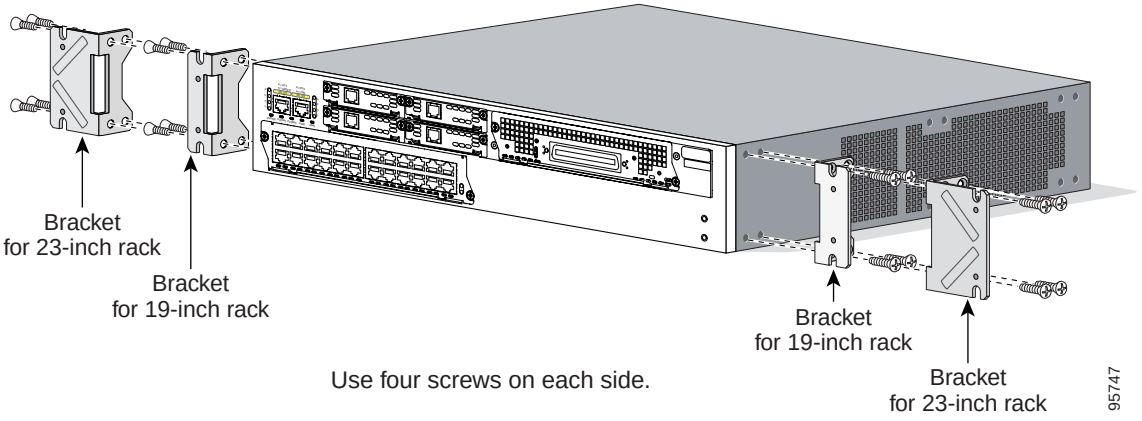
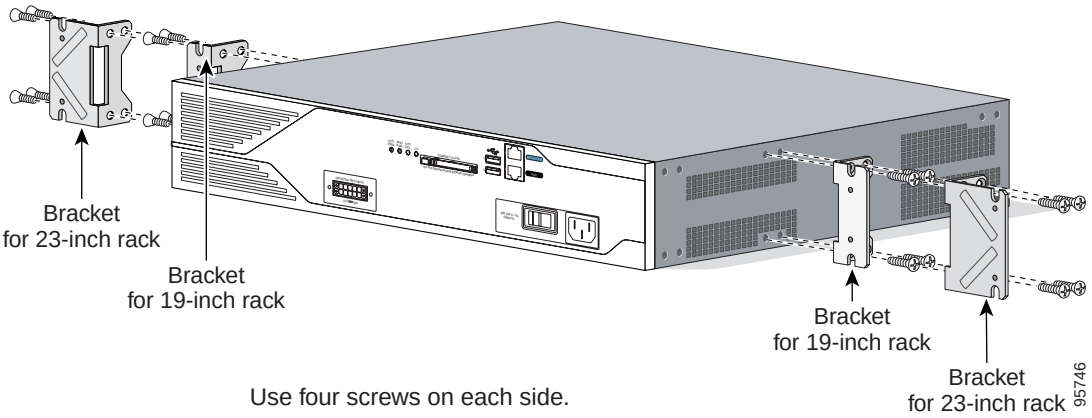


Figure 9 Bracket Installation for Center Mounting with Front Panel Forward



Installing the Router in a Rack

Warning **To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:**

- **This unit should be mounted at the bottom of the rack if it is the only unit in the rack.**
- **When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.**
- **If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.** Statement 1006

Caution Be sure to leave space above and below each router in a rack to allow for cooling air circulation.

Use two screws for each side (supplied with the rack, not with the router). Suggestion: Start the lower pair of screws first, and rest the brackets on the lower screws while you insert the upper pair of screws.

Tip The screw slots in the brackets are spaced to line up with every *second* pair of screw holes in the rack. When the correct screw holes are used, the small threaded holes in the brackets line up with unused screw holes in the rack. If the small holes do not line up with the rack holes, you must raise or lower the brackets to the next rack hole.

Attaching the Cable Management Bracket

The cable management bracket provides attachment points for organizing and routing cables. Attach the cable management bracket to the left or right rack-mount bracket using the screw provided. On rack-mount brackets for Cisco 2821 and Cisco 2851 routers, you can attach the cable management bracket to either the upper or the lower threaded hole. See Figure 10 and Figure 11 for cable management bracket attachment locations.

Figure 10 Attaching the Cable Management Bracket to the Cisco 2801 Router

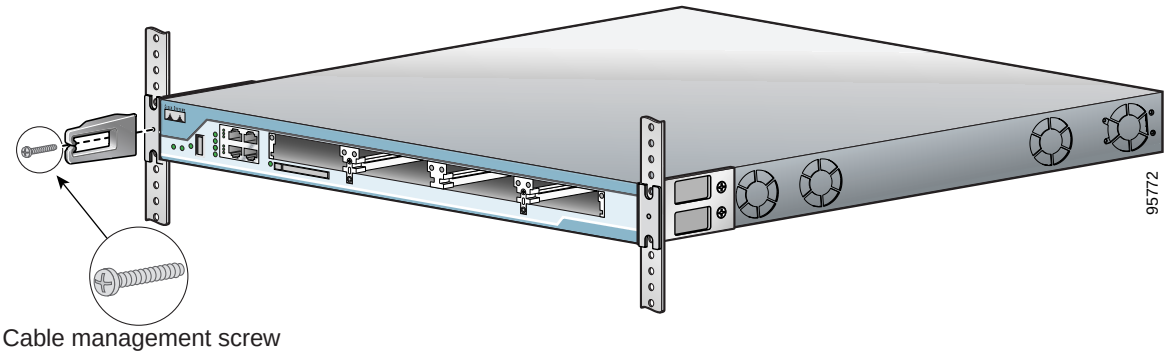
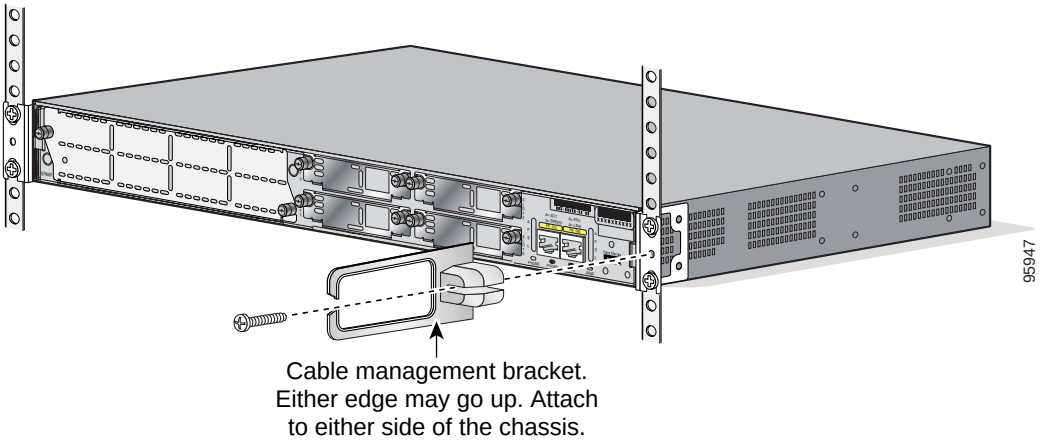


Figure 11 Attaching the Cable Management Bracket to the Cisco 2811 Router



Wall-Mounting the Router—Cisco 2811 Routers Only

You can mount a Cisco 2811 router on a wall. Cisco 2801, Cisco 2821, and Cisco 2851 routers are not designed for wall-mounting.

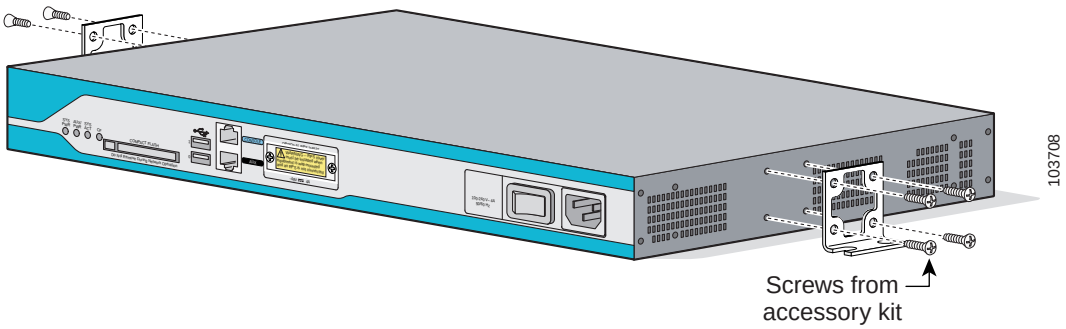
Warning **This unit is intended to be mounted on a wall. Please read the wall mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system.** Statement 248

To attach a Cisco 2811 router to a wall or other vertical surface, use the 23-inch (58.42-cm) rack-mount brackets to attach the router to the wall as described in the following sections.

Attaching Brackets to the Router for Wall Mounting

Attach the standard brackets to the chassis as shown in Figure 12, using the four screws provided for each bracket.

Figure 12 Attaching the Brackets for Wall-Mounting a Cisco 2811 Router



Attaching the Router to a Wall

Attach the router to the wall using the brackets previously attached and attachment hardware that you provide as follows:

- For attaching to a wall stud, each bracket requires two #10 wood screws (round- or pan-head) with #10 washers, or two #10 washer-head screws. The screws must be long enough to penetrate at least 3/4 inch (20 mm) into supporting wood or into a metal wall stud.
- For hollow-wall mounting, each bracket requires two wall anchors with washers. Wall anchors and washers must be size No. 10.

Caution The router must be mounted with the power connections oriented downward. Failure to do so could present a fire hazard.

Installing the Router on a Desktop

If you install your Cisco 2800 series router on a desktop, observe the following precautions:

Note For Cisco 2801 routers, attach the four rubber feet to the bottom of the chassis.

Caution Your chassis installation must allow unrestricted airflow for chassis cooling. For placing the router on a desktop, keep at least 1 inch (2.54 cm) of clear space beside the cooling inlet and exhaust vents.

Caution Do not place any items that weigh more than 10 pounds (4.5 kilograms) on top of the chassis, and do not stack routers on a desktop.

Grounding the Chassis

Warning **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.** Statement 1024

Warning **During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.** Statement 94

Note This equipment is suitable for installation in Network Telecommunications Facilities and locations where the NEC applies. The equipment is suitable for installation as part of the Common Bonding Network (CBN).

You must connect the chassis to a reliable earth ground; the ground wire must be installed in accordance with local electrical safety standards.

- For NEBS-compliant grounding, use size 6 AWG (13 mm^2) copper wire and the ground lug provided in the accessory kit.
- For NEC-compliant grounding, use size 14 AWG (2 mm^2) or larger copper wire and an appropriate user-supplied ring terminal with an inner diameter of 1/4 in. (5-7 mm).
- For EN/IEC 60950-compliant grounding, use size 18 AWG (1 mm^2) or larger copper wire and an appropriate user-supplied ring terminal.

Warning **This equipment needs to be grounded. Use a green and yellow 14 AWG ground wire to connect the host to earth ground during normal use.** Statement 190

To connect the chassis to a reliable earth ground, perform the following steps:

Step 1 Strip one end of the ground wire to the length required for the ground lug or terminal.

- For the NEBS ground lug—approximately 0.75 inches (20 mm)
- For user-provided ring terminal—as required

Step 2 Crimp the ground wire to the ground lug or ring terminal, using a crimp tool of the appropriate size.

Step 3 Attach the ground lug or ring terminal to the chassis as shown in Figure 13, Figure 14, Figure 15, Figure 16, or Figure 17. For a ground lug, use the two screws with captive locking washers provided. For a ring terminal, use one of the screws provided. Tighten the screws to a torque of 8 to 10 in-lb (0.9 to 1.1 N-m).

Note The Cisco 2801 router is not NEBS-compliant.

Step 4 Connect the other end of the ground wire to a suitable grounding point at your site.

Figure 13 Chassis Ground Connection on Cisco 2801 Chassis

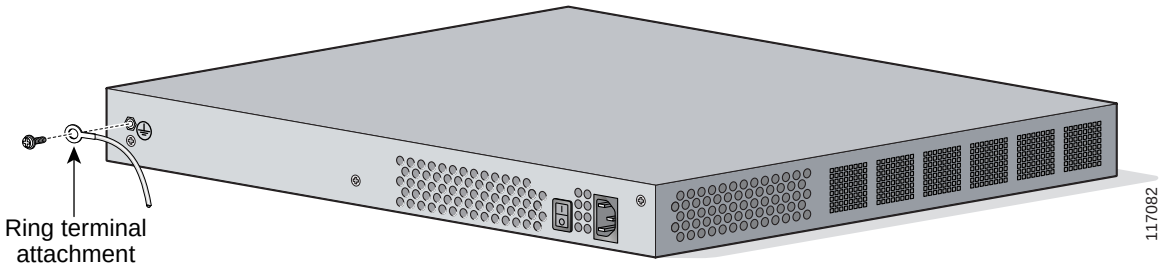


Figure 14 NEBS-Compliant Chassis Ground Connection on Cisco 2811 Chassis

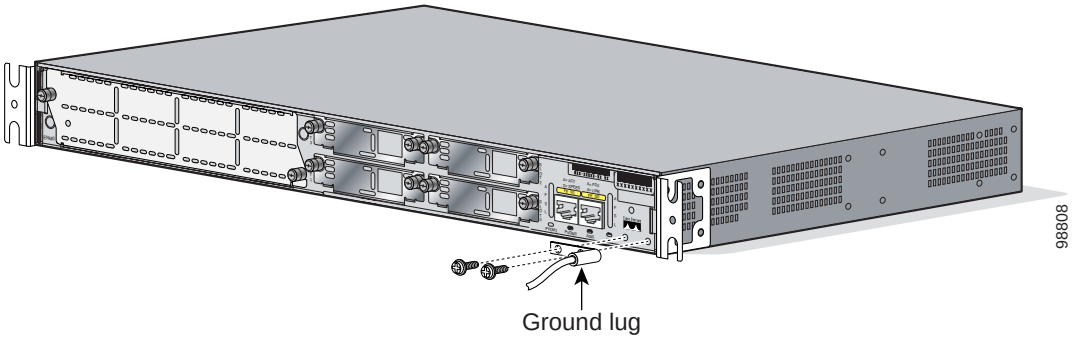


Figure 15 Chassis Ground Connection Using Ring Terminal on Cisco 2811 Chassis

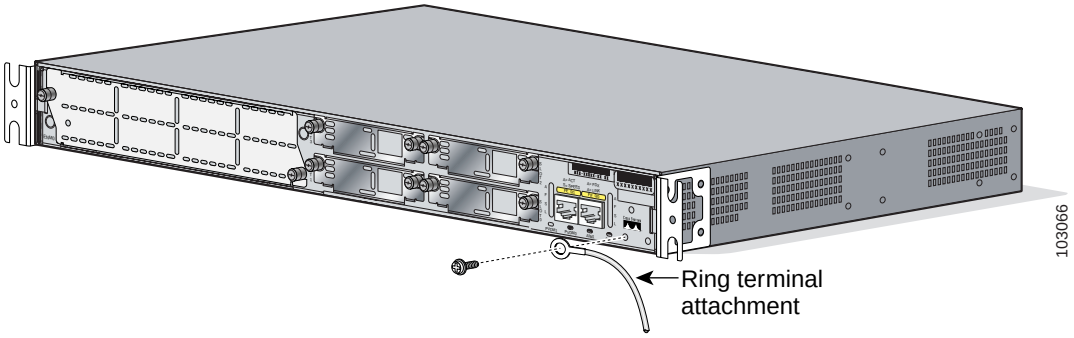


Figure 16 NEBS-Compliant Chassis Ground Connection on Cisco 2821 or Cisco 2851 Chassis

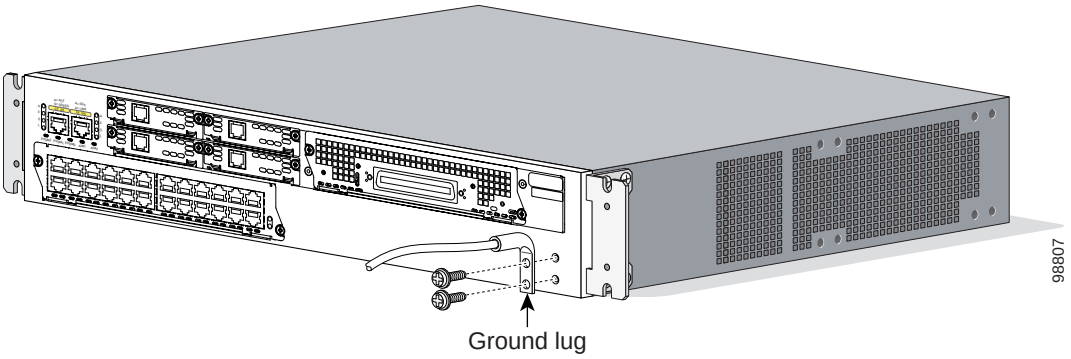
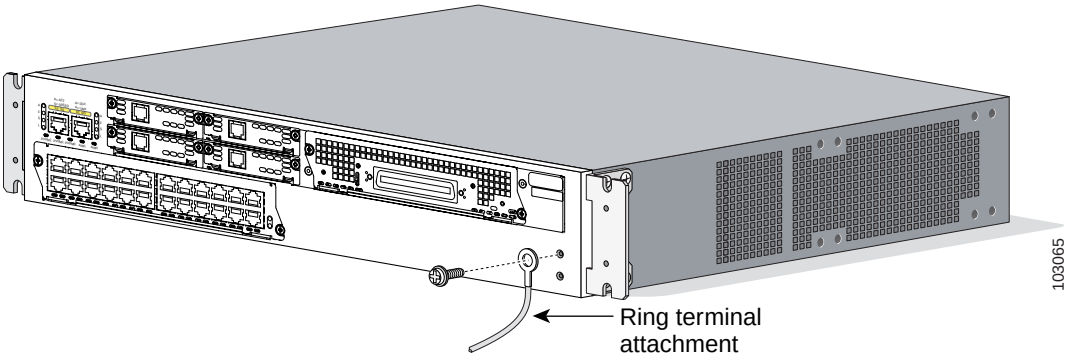


Figure 17 Chassis Ground Connection Using Ring Terminal on Cisco 2821 or Cisco 2851 Chassis



5 Connect Cables

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

Warning **The ISDN connection is regarded as a source of voltage that should be inaccessible to user contact. Do not attempt to tamper with or open any public telephone operator (PTO)-provided equipment or connection hardware. Any hardwired connection (other than by a nonremovable, connect-one-time-only plug) must be made only by PTO staff or suitably trained engineers.** Statement 23

Warning **This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.** Statement 1017

Warning **Do not work on the system or connect or disconnect cables during periods of lightning activity.** Statement 1001

Caution To comply with Telcordia NEBS GR-1089-Core and EN 300386 requirements, you must use foil twisted-pair cable that is properly grounded at both ends.

Power Connections

This section describes procedures for connecting your router to AC power, DC power, and backup power. See the appropriate subsection:

- Connecting the Router to AC Power, page 20
- Connecting the Router to DC Power, page 21
- Connecting the Router to Backup Power, page 26

Note Cisco 2801 routers are not designed to connect to DC power.

Warning **Read the installation instructions before connecting the system to the power source.** Statement 1004

Note The installation must comply with all required electrical codes applicable at the installation site.

Connecting the Router to AC Power

If your router uses AC power, connect it to a 15 A, 120 VAC (10 A, 240 VAC) circuit with overcurrent protection. If backup power is required, see the "Connecting the Router to Backup Power" section on page 26.

Note The input voltage tolerance limits for AC power are 85 and 264 VAC.

Warning **AC connected units must have a permanent ground connection in addition to the power cable ground wire. NEBS-compliant grounding satisfies this requirement.** Statement 284

Warning **This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.** Statement 1045

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than:**
120 VAC, 15 A (240 VAC, 10 A). Statement 1005

Connecting the Router to DC Power

If your router has a DC-input power supply, follow the directions in this section for proper wiring. If backup power is required, see the "Connecting the Router to Backup Power" section on page 26.

Note Cisco 2801 routers are not designed to connect to DC power.

DC Wiring Requirements for Cisco 2800 Series Routers

Caution DC return is isolated from the frame (NEBS DC-I).

Warning **This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.** Statement 1045

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 60 VDC, 20 A.** Statement 1005

Warning **Use copper conductors only.** Statement 1025

Note The DC-input power supply does not apply to Cisco 2801 router.

A Cisco 2800 series integrated services router with a DC-input power supply requires copper wire for the power connections. Table 1 and Table 2 summarize the wiring requirements.

You can connect a single DC power source to either the A input or the B input. If there are dual power sources, connect one source to the A input and one source to the B input. Both sources must be the same polarity and voltage.

Table 1 DC Wiring Requirements for Cisco 2811 Routers

DC Input	DC Input Wire Size	Safety Ground Wire Size	Wire Terminal (Lug)	Overcurrent Protection
24–36 VDC, 8 A, positive or negative, single source or dual sources	AWG 14 (2.0 mm^2)	AWG 14 (2.0 mm^2), minimum	Amp/Tyco No. 32957 or equivalent	20 A maximum
36–60 VDC, 5 A, positive or negative, single source or dual sources				

Table 2 DC Wiring Requirements for Cisco 2821 and Cisco 2851 Routers

DC Input	DC Input Wire Size	Safety Ground Wire Size	Wire Terminal (Lug)	Overcurrent Protection
24–36 VDC, 12 A, positive or negative, single source or dual sources	AWG 14 (2.0 mm^2)	AWG 14 (2.0 mm^2), minimum	Amp/Tyco No. 32957 or equivalent	20 A maximum
36–60 VDC, 8 A, positive or negative, single source or dual sources				

Wiring Procedure for DC Input

To connect the router to a DC power source, perform the following steps:

Step 1 Remove power from the DC circuit. To ensure that power is removed from the DC circuit, locate the circuit breaker for the DC circuit, switch the circuit breaker to the OFF position, and tape the circuit-breaker switch in the OFF position.

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit.** Statement 1003

Tip Secure all power cabling when installing this unit to avoid disturbing field-wiring connections.

Warning **When stranded wiring is required, use approved wiring terminations, such as closed-loop or spade-type with upturned lugs. These terminations should be the appropriate size for the wires and should clamp both the insulation and conductor.** Statement 1002

Step 2 Strip the wires to the appropriate length for the terminals. The strip length is 3/16 to 1/4 inch (5 to 6 mm) for Amp number 32957 terminals.

Step 3 Crimp the terminals onto the DC power input and safety ground wires.

Step 4 Remove the plastic covers from the terminal block. Save the covers for reinstallation after you finish wiring.

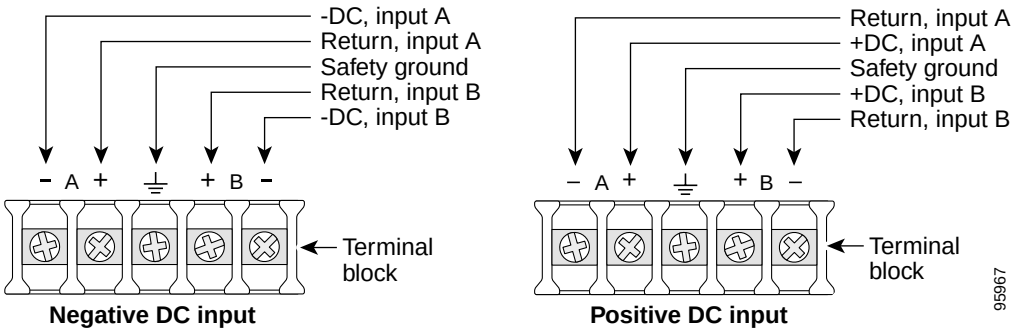
Step 5 Connect the wires to the terminal block, starting with the safety ground wire. Connect each wire to the appropriate terminal as shown in Figure 18. Tighten the terminal screws to 8.0 ± 0.5 in-lb (0.9 ± 0.05 N-m).

Warning **The illustration shows the DC power supply terminal block. Wire the DC power supply as illustrated. The proper wiring sequence is ground to ground, positive to positive, and negative to negative. The ground wire should always be connected first and disconnected last.** Statement 239

Warning **An exposed wire lead from a DC-input power source can conduct harmful levels of electricity. Be sure that no exposed portion of the DC-input power source wire extends from the terminal block plug.** Statement 122

Caution Do not overtorque the terminal block screws. The recommended torque is 8.0 ± 0.5 in-lb (0.90 ± 0.05 N-m).

Figure 18 DC Power Connections for Cisco 2800 Series Routers (Typical)



Step 6 Install the plastic covers over the terminals. (See Figure 19 or Figure 20.)

Warning **The safety cover is an integral part of the product. Do not operate the unit without the safety cover installed. Operating the unit without the cover in place will invalidate the safety approvals and pose a risk of fire and electrical hazards.** Statement 117

Step 7 Organize and secure the wires using cable ties as shown in Figure 19 or Figure 20. Make sure that the wires do not project above or below the front panel of the router.

Step 8 Turn on power to the DC circuit. Be sure to remove tape used to secure the circuit-breaker switch in the OFF position.

Figure 19 DC Wire Routing and Attachment for Cisco 2811 Routers

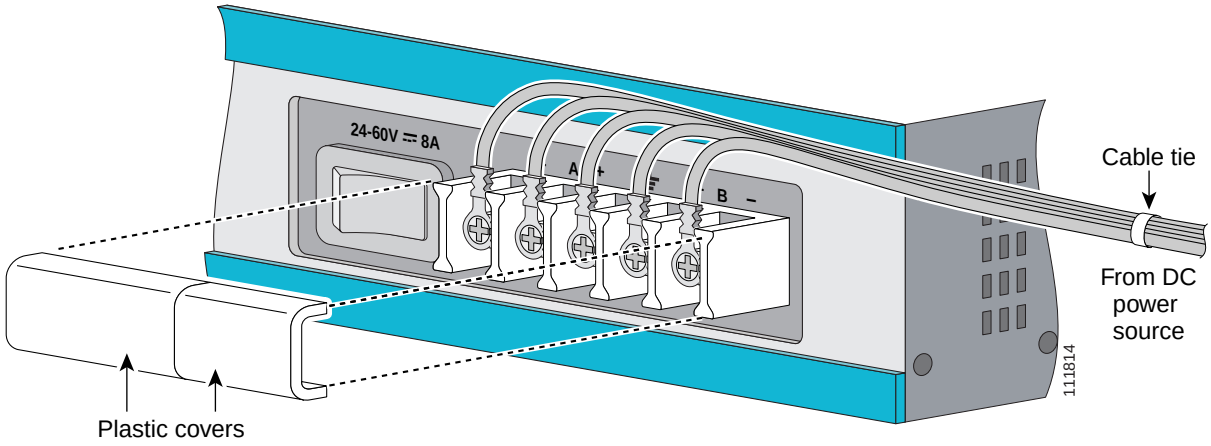
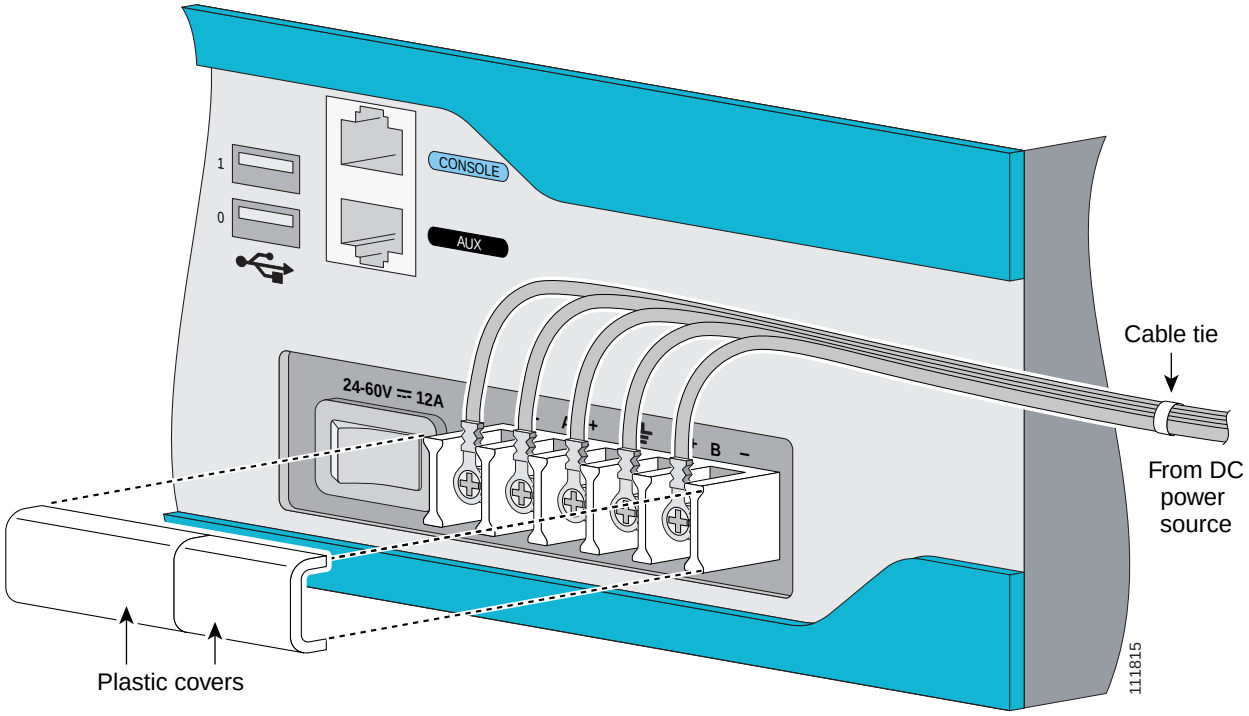


Figure 20 DC Wire Routing and Attachment for Cisco 2821 and Cisco 2851 Routers



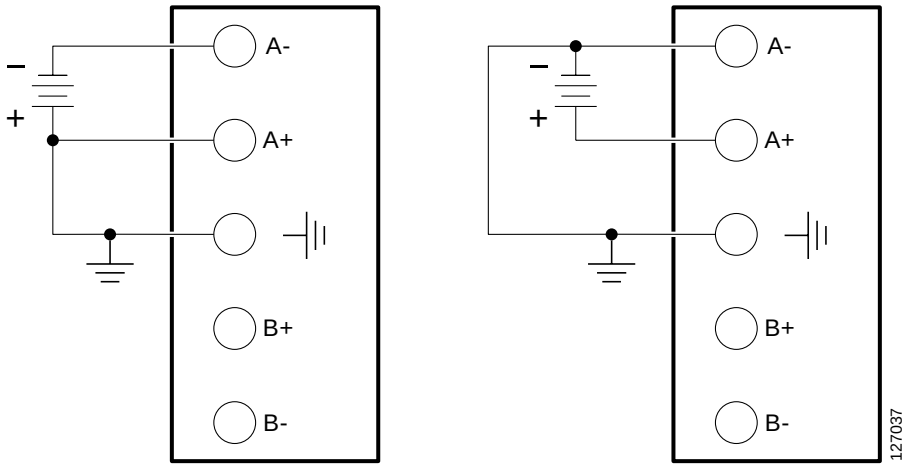
Approved Scenarios and Scenarios Not Approved for Dual DC Power Supply Configuration

You can connect a single DC power source to either the A input or the B input. If there are dual power sources, connect one source to the A input and one source to the B input. Both sources must be the same polarity (with respect to ground) and voltage (within 0.25 volts). Do not connect –DC grounded and +DC grounded dual sources to Cisco 2811, Cisco 2821, and Cisco 2851 series integrated services routers.

Caution Dual sources with opposite-polarity grounding damage equipment.

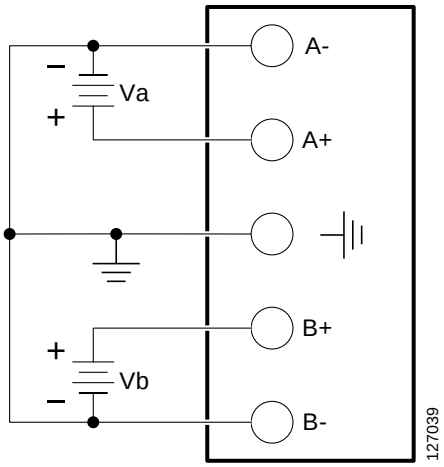
In Figure 21, either the positive source terminal or the negative source terminal is tied to ground.

Figure 21 Connecting to One Source Only—Source A or Source B



In Figure 22, source A and source B share common negative terminal connections.

Figure 22 Connecting Source A and Source B with Common Negative Terminals

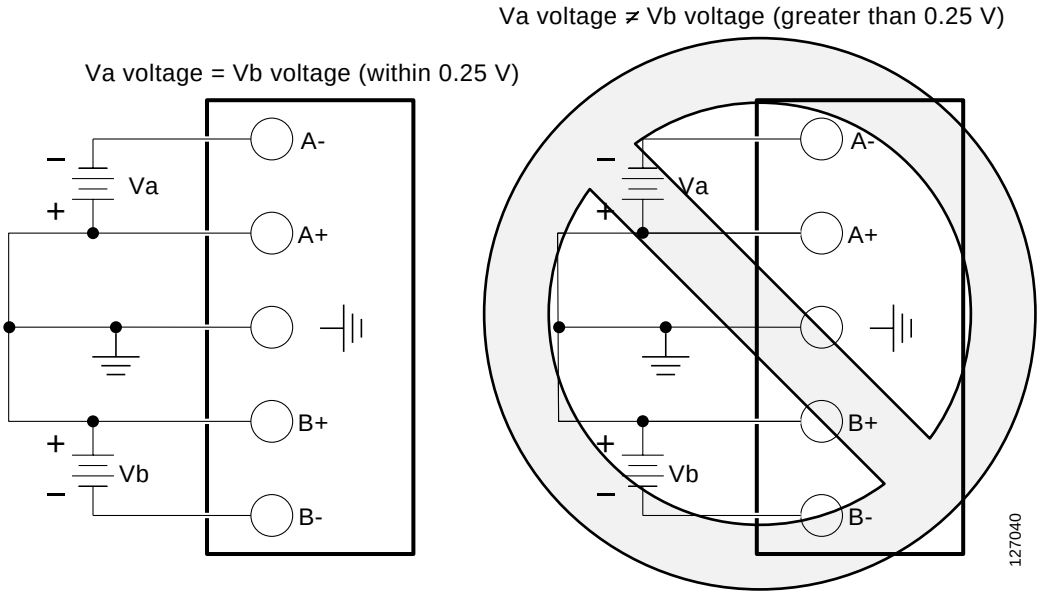


In Figure 23, source A and source B share common positive terminal connections. This is allowed only if Va equals Vb (within 0.25 V).

Caution When connecting source A and source B with common positive terminals, if source A and source B voltages are unequal by more than 0.25 V, the higher-voltage source can discharge into the lower-voltage source through the A- and B- input terminals. Excessive discharging currents through these terminals can cause one or both of the dual input DC power supply's internal A- or B- fuses to open, resulting in lack of redundancy or system failure. When source A and source B are within 0.25 V, discharge current is minimal.

Note When source A and source B are wired with common negative terminals, as in Figure 22, discharging does not occur and there is no restriction requiring that source A and source B voltages be equal.

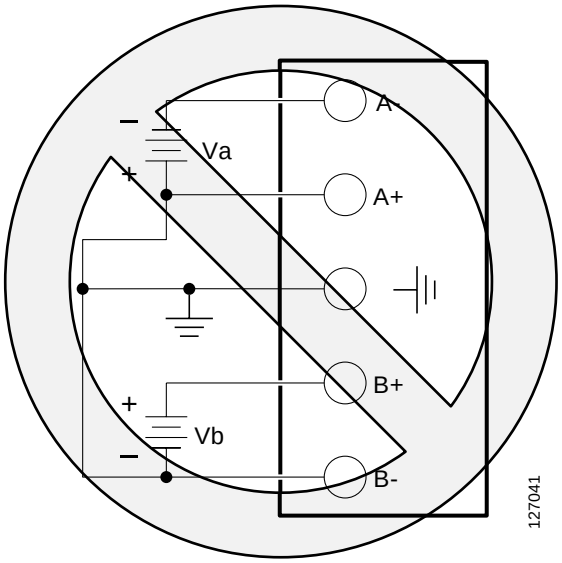
Figure 23 Connecting Source A and Source B with Common Positive Terminals



In Figure 24, source A and source B are wired with opposite polarity grounds. *Do not* use this configuration.

Caution *Do not* use the DC input configuration shown in Figure 24.

Figure 24 Source A and Source B Wired with Opposite-Polarity Grounds



Connecting the Router to Backup Power

If your router uses the Cisco Redundant Power System (RPS), see the *Cisco RPS-675 Hardware Installation Guide* for instructions about the power connections. To locate this document, see the "Where to Go Next" section on page 36.

Caution Before connecting the RPS to the router, make sure that either the RPS is in standby mode or the RPS AC power is disconnected. Connecting the RPS to AC power automatically places the RPS in active mode.

Note The RPS is not supported on Cisco 2801 routers.

WAN, LAN, and Voice Connections

The connections and cables listed in Table 3 are described in detail in the Cisco 2800 series hardware installation documents at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/2800/hw/index.htm

Note One or two Ethernet cables are typically provided with the router. Additional cables and transceivers can be ordered from Cisco. For ordering information, contact customer service. For cable pinouts, see the *Cisco Modular Access Router Cable Specifications* document.

Warning **Hazardous network voltages are present in WAN ports regardless of whether power to the router is OFF or ON. To avoid electric shock, use caution when working near WAN ports. When detaching cables, detach the end away from the router first.** Statement 1026

Warning **Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.** Statement 1036

Warning **Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.** Statement 1037

Warning **To report a gas leak, do not use a telephone in the vicinity of the leak.** Statement 1039

Warning **Class 1 laser product.** Statement 1008

Table 3 summarizes some typical WAN, LAN, and voice connections for the Cisco 2800 series routers.

Table 3 WAN, LAN, and Voice Connections

Port or Connection	Port Type, Color	Connection	Cable
Ethernet	RJ-45, yellow	Ethernet hub or Ethernet switch	Category 5 or later Ethernet
T1/E1 WAN xCE1T1-PRI	RJ-48C/CA81A RJ-48S, tan	T1 or E1 network External T1 CSU or other T1 equipment	RJ-48 T1/E1 RJ-48S to RJ-48S TE; RJ-48S to RJ-48S NT; RJ-48S to RJ-48S T1' RJ-48S to bare RJ-48S to BNC; RJ-48S to twinaxial cable RJ-48S to DB-15 RJ-48S to DB-15 null
T3/DS3/E3 WAN	BNC connector	T3 network, CSU/DSU, or other T3/DS3 equipment	75-ohm coaxial cable
OC3 / STM-1 WAN	SC connector	OC3/STM-1 network or device	Single-mode or multimode optical fiber
Cisco serial	60-pin D-sub, blue	CSU/DSU and serial network or equipment	Cisco serial transition cable that matches the signaling protocol (EIA/TIA-232, EIA/TIA-449, V.35, X.21, or EIA-530) and the serial port operating mode (DTE or DCE).[1]
Cisco Smart Serial	Cisco Smart compact connector, blue	CSU/DSU and serial network or equipment	
ADSL	RJ-11C/CA11A, lavender	Network demarcation device for service provider's DSL interface	RJ-11 straight-through
SHDSL	RJ-11C/CA11A, lavender, RJ-14	Network demarcation device for service provider's DSL interface	RJ-11 straight-through for 2-wire RJ-14 straight-through for 4-wire
T1/E1 digital voice	RJ-48C/CA81A, tan	Digital PBX, ISDN network, CSU/DSU	RJ-48 T1/E1
Analog voice FXS	RJ-11, gray	Telephone, fax	RJ-11; RJ21 if using NM-HDA, straight-through
Analog voice FXO	RJ-11, pink	Central office, analog PBX	
Analog voice E&M	RJ-45, brown	Analog PBX	RJ-45
BRI S/T WAN (external NT1)	RJ-45/CB-1D, orange	NT1 device or private integrated network exchange (PINX)	RJ-45 straight-through
BRI U WAN (built-in NT1)	RJ-49C/CA-A11, red	ISDN network	RJ-48 straight-through
56/64-kbps DSU/CSU	8-pin modular, blue	RJ-48S interface in subrate device or network	RJ-48 straight-through
T1/FT1 DSU/CSU	8-pin modular, blue	RJ-48C interface	RJ-48 straight-through
Gigabit Ethernet SFP, optical	LC, color according to optical wavelength	1000BASE-SX, -LX, -LH, -ZX, -CWDM	Optical fiber as specified on applicable data sheet
Gigabit Ethernet SFP, copper	RJ-45	1000BASE-T	Category 5, 5e, 6 UTP

1. See the *Cisco Modular Access Router Cable Specifications* document for information about selecting these cables.

System Management Connections

The connections described in Table 4 provide system management access.

Table 4 System Management Connections

Port	Color	Connection	Cable
Console	Light blue	PC or ASCII terminal communication port (usually labeled COM)	RJ-45-to-DB-9 console cable
Auxiliary	Black	Modem for remote access	RJ-45-to-DB-25 modem cable
Universal serial bus (USB)	—	Peripheral devices	USB cable

6 Power Up the Router

Caution To ensure adequate cooling, never operate the router unless the cover and all modules and cover plates are installed.

Checklist for Power-Up

You are ready to power up the Cisco 2800 series integrated services router after the following steps are completed:

- Chassis is securely mounted and grounded. (See the “Install Chassis” section on page 6.)
- Power and interface cables are connected. (See the “Connect Cables” section on page 19.)
- Make sure that the external CompactFlash memory card is properly seated into the slot. For installation instructions, see the online Cisco 2800 series hardware installation documentation at the following URL:

  http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/2800/hw/index.htm
- PC with terminal emulation program is connected to the console port, powered up, and configured for 9600 baud, 8 data bits, 1 stop bit, no flow control, and no parity. (See the “System Management Connections” section on page 28.)
- Suitable PC COM port is selected in the terminal emulation program.

Note For initial power-up, a direct console connection is recommended. After the initial configuration is completed, a remote modem connection can be used for router management.

Caution To ensure adequate cooling, never operate the router unless the cover and all modules and cover plates are installed.

Caution To prevent damage to the ejector mechanism, the ejector button next to the CompactFlash card must remain fully seated when not being used to eject a CompactFlash card.

Power-Up Procedure

To power up your Cisco 2800 series router and verify that it goes through its initialization and self-test, perform this procedure. When the procedure is finished, the Cisco 2800 series router is ready to configure.

Note To view the boot sequence, you must have a console connection to the Cisco 2800 series router *before* it powers up.

Step 1 Make sure that your PC is powered up and connected as described in the "Checklist for Power-Up" section on page 28.

Step 2 Move the power switch to the ON position. The SYS PWR LED on the front of the chassis blinks green and the fans operate. If this does not happen, see the "Troubleshooting" module in the online Cisco 2800 series hardware installation documentation at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/2800/hw/index.htm

Startup messages appear in your terminal emulation program window. When the startup messages end, the SYS PWR LED comes on solid green.

Caution *Do not press any keys on the keyboard until the messages stop and the SYS PWR LED is solid green*. Any keys pressed during this time are interpreted as the first command typed when the messages stop, which might cause the router to power off and start over. It takes a few minutes for the messages to stop.

You may see different startup messages:

- If you see the following messages, the router has booted with a configuration file and is ready for initial configuration using Cisco Router and Security Device Manager (SDM):

```
yourname con0 is now available

Press RETURN to get started.
```

Note Because SDM is installed on your router by default, we recommend using SDM to perform the initial configuration.

See the "Initial Configuration Using Cisco Router and Security Device Manager (SDM)" section on page 32 to learn how to configure your router using SDM, or how to obtain SDM and install it on your router.

- If you see the following messages, the router has booted and is ready for initial configuration using the setup command facility or the command-line interface (CLI):

```
--- System Configuration Dialog ---

At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.

Would you like to enter the initial configuration dialog? [yes/no]:
```

To learn how to use the setup command facility to configure the router, see the "Initial Configuration Using the Setup Command Facility" section on page 33. To learn how to use the CLI to configure the router, see the "Initial Configuration Using the Cisco CLI—Manual Configuration" section on page 35.

If the `rommon 1>` prompt appears, your system has booted in ROM monitor mode. For information on using ROM monitor, see the *Troubleshooting and Maintenance* module in the Cisco 2800 series software configuration documentation at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/2800/sw/index.htm

Verify the Front Panel LED Indications

The indicator LEDs described in Table 5 provide power, activity, and status information:

Table 5 LED Indicators on Front Panel

LED Label	LED Color or State	Meaning
SYS PWR	Solid green	System is operating normally.
	Blinking green	System is booting or is in ROM monitor mode.
	Amber	System error.
	Off	Power is off.
AUX/ PWR	Green	IP phone power is operating normally (if installed) or Cisco Redundant Power System (RPS) is operating normally (if installed).
	Amber	IP phone power fault (if installed) or Cisco Redundant Power System (RPS) fault (if installed).
	Off	IP phone power and Cisco RPS are not installed.
SYS ACT	Blinking green or solid green	Packet transfers are occurring.
	Off	No packet transfers are occurring.
CF	Green	CompactFlash memory is being accessed; do not eject.
	Off	CompactFlash memory is not being accessed; OK to eject.

Verify the Hardware Configuration

To display and verify the hardware features, enter the following commands:

- show version—Displays the system hardware version; the installed software version; the names and sources of configuration files; the boot images; and the amount of installed DRAM, NVRAM, and flash memory.
- show diag—Lists and displays diagnostic information about the installed controllers, interface processors, and port adapters. Typical examples are network modules, interface cards (VICs, WICs, HWICs), and advanced integration modules (AIMs).

7 Interface Numbering

Table 6 summarizes the interface numbering on a Cisco 2801 series router. Table 7 summarizes the interface numbering on Cisco 2811, Cisco 2821, and Cisco 2851 series routers.

Note The interface numbering on Cisco 2800 series routers is different from the numbering on Cisco 2600 series routers.

Note On the Cisco 2801 router, the numbering format for slots is *interface type 0/slot/port*. “0” indicates slots that are built into the chassis of a router. On the Cisco 2801 router, all slots begin with “0,” because all slots are built into the chassis. Note that this is different from the Cisco 2811, Cisco 2821, and Cisco 2851 routers. On these routers, some slots are built into the chassis and have slot numbers that begin with “0.” However, it is possible to have other slots that are part of a network module or an extension voice module. Those slots have slot numbers that begin with “1” or “2,” respectively.

Table 6 Interface Numbering on Cisco 2801 Series Routers

Slot Number	Slot Type	Interface Numbering Range
Onboard ports	Fast Ethernet	0/0 and 0/1
0	VIC/VWIC (voice only—no PRI support)	0/0/0 to 0/0/3
1	HWIC/WIC/VIC/VWIC[1]	0/1/0 to 0/1/3 (single-wide HWIC) 0/1/0 to 0/1/8 (double-wide HWIC)
2	WIC/VIC/VWIC[1]	0/2/0 to 0/2/3
3	HWIC/WIC/VIC/VWIC[1]	0/3/0 to 0/3/3 (single-wide HWIC) 0/3/0 to 0/3/8 (double-wide HWIC)

1. A VWIC in slots 1, 2, and 3 can operate in both data and voice mode; in slot 0, a VWIC can operate only in voice mode.

On the Cisco 2801 router, the numbering format for configuring an asynchronous interface is *0/slot/port*. To configure the line associated with an asynchronous interface, simply use the interface number to specify the asynchronous line. For example, line 0/1/0 specifies the line associated with interface serial 0/1/0 on a WIC-2A/S in slot 1. Similarly, line 0/2/1 specifies the line associated with interface async 0/2/1 on a WIC-2AM in slot 2.

Table 7 Interface Numbering on Cisco 2811, Cisco 2821, and Cisco 2851 Series Integrated Services Routers

Port Location	Interface Numbering Scheme	Examples[1, 2]
Built into the chassis front panel	*Interface-type port*	usb 0 usb 1
Built into the chassis rear panel	*Interface-type* 0 / *port*	interface fa 0/x interface gi 0/x
In an interface card (HWIC, HWIC-D, WIC, VWIC, VIC) plugged directly into an HWIC slot in a chassis	*Interface-type* 0 / *interface-card-slot*[3] / *port* **Note** Interface card slots built into the chassis are labeled HWIC *slot-number* on Cisco 2800 series routers.	interface serial 0/x/y interface async 0/x/y line 0/x/y[4] interface fa 0/x/y voice-port 0/x/y
In an interface card (WIC, VWIC, VIC) plugged into a slot in a network module	*Interface-type* 1[5] / *interface-card-slot* / *port*	controller t1 1/x/y voice-port 1/x/y interface serial 1/x/y interface async 1/x/y line 1/x/y[4]
Built into a network module (NME, NME-X, NMD, NME-XD)	*Interface-type* 1[5] / *port*	interface gi 1/x interface serial 1/x interface async 1/x line 1/x[4]
FXS or FXO port in an extension voice module (EVM)	*Interface-type* 2[6] / 0[7] / *port* FXS/DID port numbers 0 to 7 are built into the EVM. FXS/FXO port numbers 8 to 15 are in expansion module 0. FXS/FXO port numbers 16 to 23 are in expansion module 1.	voice-port 2/0/x
Voice port in a BRI expansion module (internal slot) in an extension voice module (EVM)	*Interface-type* 2[6] / 0[7] / *port* Port numbers are 8 to 11 in expansion module 0. Port numbers are 16 to 19 in expansion module 1.	voice-port 2/0/x
BRI interface in a BRI expansion module (internal slot) in an extension voice module (EVM)	*Interface-type* 2[6] / *port* Port numbers are 0 to 3 if one expansion module is installed. Port numbers are 0 to 7 if two expansion modules are installed.	interface bri 2/x

1. Interface abbreviations: fa = Fast Ethernet; gi = Gigabit Ethernet; usb = Universal Serial Bus; bri = ISDN basic rate interface.
2. The interfaces listed are examples only; other possible interface types are not listed.
3. Interface card slot numbers for double (HWIC-D) slots are 1 and 3 only.
4. Specify the line number in the Cisco IOS CLI by using the interface number for the associated asynchronous serial interface.
5. “1” is the network module slot number in all Cisco 2800 series routers.
6. “2” is the EVM slot number in Cisco 2821 and Cisco 2851 routers.
7. “0” is required by the CLI syntax for voice ports in an EVM; it indicates no interface card slots in EVMs.

Note On the Cisco 2811, Cisco 2821, and Cisco 2851 routers, the interface numbering scheme is the same for asynchronous interfaces as other types of interfaces. To configure the line associated with an async interface, simply use the interface number to specify the async line. For example, line 0/3/0 specifies the line associated with interface serial 0/3/0 on a WIC-2A/S in slot 3. Similarly, line 1/22 specifies the line associated with interface async 1/22 on an NM-32A in network module slot 1.

8 Perform Initial Configuration

You can configure your router by using one of the following tools:

- Cisco Router and Security Device Manager (SDM)—See the “Initial Configuration Using Cisco Router and Security Device Manager (SDM)” section on page 32.
- Setup command facility—See the “Initial Configuration Using the Setup Command Facility” section on page 33.
- Command-line interface (CLI)—See the “Initial Configuration Using the Cisco CLI—Manual Configuration” section on page 35.

Note If you need help with the interface and port numbering, see the “Interface Numbering” section on page 30.

Initial Configuration Using Cisco Router and Security Device Manager (SDM)

If the following messages appear at the end of the startup sequence, Cisco Router and Security Device Manager (SDM) is installed on your router:

```
yourname con0 is now available

Press RETURN to get started.
```

For instructions on configuring your router by using SDM, see the *Cisco Router and Security Device Manager (SDM) Quick Start Guide* that shipped with your router.

Tip If the messages above do not appear, SDM and the *Cisco Router and Security Device Manager (SDM) Quick Start Guide* were not shipped with your router. If you want to use SDM, you can download the latest version of SDM and instructions for installing it on your router from the following location:

http://www.cisco.com/pcgi-bin/tablebuild.pl/sdm

To obtain the SDM quick start guide, SDM release notes, and other SDM documentation, go to *www.cisco.com/go/sdm* and click the Technical Support and Documentation link.

Initial Configuration Using the Setup Command Facility

This section shows how to use the setup command facility to configure a hostname for the router, set passwords, and configure an interface for communication with the management network. If the following messages appear at the end of the startup sequence, the setup command facility has been invoked automatically:

```
--- System Configuration Dialog ---

At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.

Would you like to enter the initial configuration dialog? [yes/no]:
```

The setup command facility prompts you for basic information about your router and network, and it creates an initial configuration file. After the configuration file is created, you can use the CLI or Cisco Router and Security Device Manager (SDM) to perform additional configuration.

The prompts in the setup command facility vary depending on your router model, the installed interface modules, and the software image. The following example and the user entries (in **bold**) are shown as examples only.

For help with interface and port numbering, see the "Interface Numbering" section on page 30.

Note If you make a mistake while using the setup command facility, you can exit and run the setup command facility again. Press Ctrl-C, and type setup at the privileged EXEC mode prompt (`Router#`).

Step 1 To proceed using the setup command facility, enter yes when the power-up messages have ended.

```
Would you like to enter the initial configuration dialog? [yes/no]: yes
```

Step 2 When the following messages appear, press Return to enter basic management setup:

```
At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.

Basic management setup configures only enough connectivity
for management of the system, extended setup will ask you
to configure each interface on the system

Would you like to enter basic management setup? [yes/no]: yes
```

Step 3 Enter a hostname for the router (this example uses Router):

```
Configuring global parameters:

Enter host name [Router]: Router
```

Step 4 Enter an enable secret password. This password is encrypted (more secure) and cannot be seen when you view the configuration:

```
The enable secret is a password used to protect access to
privileged EXEC and configuration modes. This password, after
entered, becomes encrypted in the configuration.
Enter enable secret: xxxxxx
```

Step 5 Enter an enable password that is different from the enable secret password. This password is *not* encrypted (less secure) and can be seen when you view the configuration:

```
The enable password is used when you do not specify an
enable secret password, with some older software versions, and
some boot images.
Enter enable password: xxxxxx
```

Step 6 Enter the virtual terminal password, which prevents unauthenticated access to the router through ports other than the console port:

```
The virtual terminal password is used to protect
access to the router over a network interface.
Enter virtual terminal password: xxxxxx
```

Step 7 Respond to the following prompts as appropriate for your network:

```
Configure SNMP Network Management? [yes]:
    Community string [public]:
```

A summary of the available interfaces appears:

Note The interface numbering that appears is dependent on the type of Cisco modular router platform and on the installed interface modules and cards.

```
Current interface summary

Controller Timeslots D-Channel Configurable modes Status
T1 0/0/0   24        23        pri/channelized    Administratively up
T1 0/0/1   24        23        pri/channelized    Administratively up
T1 0/2/0   24        23        pri/channelized    Administratively up
T1 0/2/1   24        23        pri/channelized    Administratively up

Any interface listed with OK? value "NO" does not have a valid configuration

Interface                  IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0         20.0.0.40       YES DHCP   up                    up
GigabitEthernet0/1         unassigned      NO  unset  up                    up
GigabitEthernet0/3/0       unassigned      NO  unset  up                    up
```

Step 8 Choose one of the available interfaces for connecting the router to the management network:

```
Enter interface name used to connect to the
management network from the above interface summary: fastethernet0/0
```

Step 9 Respond to the following prompts as appropriate for your network:

```
Configuring interface FastEthernet0/0:
Use the 100 Base-TX (RJ-45) connector? [yes]: yes
Operate in full-duplex mode? [no]: no
Configure IP on this interface? [yes]: yes
    IP address for this interface: 172.1.2.3
    Subnet mask for this interface [255.255.0.0] : 255.255.0.0
    Class B network is 172.1.0.0, 16 subnet bits; mask is /16
```

Step 10 The configuration is displayed:

```
The following configuration command script was created:

hostname Router
enable secret 5 $1$D5P6$PYx41/lQIASK.HcSbfO5q1
enable password xxxxxx
line vty 0 4
password xxxxxx
snmp-server community public
!
no ip routing

!
interface FastEthernet0/0
no shutdown
media-type 100BaseX
half-duplex
ip address 172.1.2.3 255.255.0.0
!
```

```
interface FastEthernet0/1
shutdown
no ip address
!
end
```

Step 11 Respond to the following prompts. Choose [2] to save the initial configuration:

```
[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.

Enter your selection [2]: 2
Building configuration...
Use the enabled mode 'configure' command to modify this configuration.


Press RETURN to get started!
```

The user prompt appears:

```
Router>
```

Step 12 Verify the initial configuration. See the "Verify the Initial Configuration" section on page 36 for verification procedures.

Initial Configuration Using the Cisco CLI—Manual Configuration

This section shows how to display a command-line interface (CLI) prompt for configuration using the CLI, and it directs you to documentation for the CLI configuration. You can use the CLI if the following messages appear at the end of the startup sequence:

```
--- System Configuration Dialog ---

At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.

Would you like to enter the initial configuration dialog? [yes/no]:
```

If these messages do not appear, SDM and a default configuration file were installed on the router at the factory. To use SDM to configure the router, see the "Initial Configuration Using Cisco Router and Security Device Manager (SDM)" section on page 32.

For help with interface and port numbering, see the "Interface Numbering" section on page 30.

Step 1 To proceed with manual configuration using the CLI, enter no when the power-up messages end:

```
Would you like to enter the initial configuration dialog? [yes/no]: no
```

Step 2 Press Return to terminate autoinstall and continue with manual configuration:

```
Would you like to terminate autoinstall? [yes] Return
```

Several messages appear, ending with a line similar to the following:

```
...
Copyright (c) 1986-2004 by cisco Systems, Inc.
Compiled <date> <time> by <person>
```

Step 3 Press Return to display the `Router>` prompt.

```
...
flashfs[4]: Initialization complete.
Router>
```

Step 4 Enter privileged EXEC mode:

```
Router> enable
Router#
```

Step 5 For configuration procedures, see the applicable configuration instructions in the Cisco 2800 series software configuration documents. See the "Where to Go Next" section on page 36 for information about accessing these documents.

Note To avoid losing work you have completed, be sure to save your configuration occasionally as you proceed. Use the copy running-config startup-config command to save the configuration to NVRAM.

Step 6 When you have finished the initial configuration, verify the initial configuration. See the "Verify the Initial Configuration" section on page 36 for verification procedures.

Verify the Initial Configuration

Verify that the new interfaces are operating correctly by performing the following tests:

- To verify that the interfaces are operating correctly and that the interfaces and line protocol are in the correct state—up or down—enter the show interfaces command.
- To display a summary status of the interfaces configured for IP, enter the show ip interface brief command.
- To verify that you configured the correct hostname and password, enter the show configuration command.

When you complete and verify the initial configuration, your Cisco router is ready to configure for specific functions. See the "Where to Go Next" section on page 36 for information about locating documentation for advanced configuration procedures.

9 Where to Go Next

For additional configuration procedures, see the appropriate Cisco 2800 series routers documentation or Cisco IOS software documentation, available online on Cisco.com.

Tip See the "Obtaining Documentation" section on page 36 for help in locating these documents.

To access documentation on Cisco.com:

For Cisco 2800 series routers platform documentation, start on Cisco.com at http://www.cisco.com, and choose Products & Solutions > Routers & Routing Systems > Cisco 2800 Series Integrated Services Routers > Technical Support and Documentation > *Cisco 2800 Integrated Services Routers document type* > *Document*.

For Cisco IOS software documentation, start on Cisco.com at http://www.cisco.com, and choose Products & Solutions > Cisco IOS Software > Latest Releases > *Your Cisco IOS software release*.

To get updated information about platform support for features, access Feature Navigator II at http://www.cisco.com/go/fn. (This requires a registered account on Cisco.com.)

To access documentation using Cisco Connection Online (CCO):

For Cisco 2800 series routers platform documentation, start on Cisco.com at http://www.cisco.com, and click the Technical Support and Documentation link. Click the Former Technical Documentation site link and navigate to Modular Access Routers and to the documentation for your router.

For Cisco IOS software documentation, start on Cisco.com at http://www.cisco.com, and click the Technical Support and Documentation link. Click the Former Technical Documentation site link and navigate to the Cisco IOS software documentation for the Cisco IOS software release that is installed on your router.

10 Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

http://www.cisco.com/techsupport

You can access the Cisco website at this URL:

http://www.cisco.com

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Product Documentation DVD

Cisco documentation and additional literature are available in the Product Documentation DVD package, which may have shipped with your product. The Product Documentation DVD is updated regularly and may be more current than printed documentation.

The Product Documentation DVD is a comprehensive library of technical product documentation on portable media. The DVD enables you to access multiple versions of hardware and software installation, configuration, and command guides for Cisco products and to view technical documentation in HTML. With the DVD, you have access to the same documentation that is found on the Cisco website without being connected to the Internet. Certain products also have .pdf versions of the documentation available.

The Product Documentation DVD is available as a single unit or as a subscription. Registered Cisco.com users (Cisco direct customers) can order a Product Documentation DVD (product number DOC-DOCDVD=) from Cisco Marketplace at this URL:

http://www.cisco.com/go/marketplace/

Ordering Documentation

Beginning June 30, 2005, registered Cisco.com users may order Cisco documentation at the Product Documentation Store in the Cisco Marketplace at this URL:

http://www.cisco.com/go/marketplace/

Nonregistered Cisco.com users can order technical documentation from 8:00 a.m. to 5:00 p.m. (0800 to 1700) PDT by calling 1 866 463-3487 in the United States and Canada, or elsewhere by calling 011 408 519-5055. You can also order documentation by e-mail at tech-doc-store-mkpl@external.cisco.com or by fax at 1 408 519-5001 in the United States and Canada, or elsewhere at 011 408 519-5001.

11 Documentation Feedback

You can rate and provide feedback about Cisco technical documents by completing the online feedback form that appears with the technical documents on Cisco.com.

You can send comments about Cisco documentation to bug-doc@cisco.com.

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

12 Cisco Product Security Overview

Cisco provides a free online Security Vulnerability Policy portal at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

From this site, you can perform these tasks:

- Report security vulnerabilities in Cisco products.
- Obtain assistance with security incidents that involve Cisco products.
- Register to receive security information from Cisco.
- A current list of security advisories and notices for Cisco products is available at this URL:

  http://www.cisco.com/go/psirt

If you prefer to see advisories and notices as they are updated in real time, you can access a Product Security Incident Response Team Really Simple Syndication (PSIRT RSS) feed from this URL:

http://www.cisco.com/en/US/products/products_psirt_rss_feed.html

Reporting Security Problems in Cisco Products

Cisco is committed to delivering secure products. We test our products internally before we release them, and we strive to correct all vulnerabilities quickly. If you think that you might have identified a vulnerability in a Cisco product, contact PSIRT:

- Emergencies—security-alert@cisco.com

  An emergency is either a condition in which a system is under active attack or a condition for which a severe and urgent security vulnerability should be reported. All other conditions are considered nonemergencies.
- Nonemergencies—psirt@cisco.com

In an emergency, you can also reach PSIRT by telephone:

- 1 877 228-7302
- 1 408 525-6532

Tip We encourage you to use Pretty Good Privacy (PGP) or a compatible product to encrypt any sensitive information that you send to Cisco. PSIRT can work from encrypted information that is compatible with PGP versions 2.*x* through 8.*x*.

Never use a revoked or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one linked in the Contact Summary section of the Security Vulnerability Policy page at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

The link on this page has the current PGP key ID in use.

13 Obtaining Technical Assistance

Cisco Technical Support provides 24-hour-a-day award-winning technical assistance. The Cisco Technical Support & Documentation website on Cisco.com features extensive online support resources. In addition, if you have a valid Cisco service contract, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not have a valid Cisco service contract, contact your reseller.

Cisco Technical Support & Documentation Website

The Cisco Technical Support & Documentation website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, at this URL:

http://www.cisco.com/techsupport

Access to all tools on the Cisco Technical Support & Documentation website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Note Use the Cisco Product Identification (CPI) tool to locate your product serial number before submitting a web or phone request for service. You can access the CPI tool from the Cisco Technical Support & Documentation website by clicking the Tools & Resources link under Documentation & Tools. Choose Cisco Product Identification Tool from the Alphabetical Index drop-down list, or click the Cisco Product Identification Tool link under Alerts & RMAs. The CPI tool offers three search options: by product ID or model name; by tree view; or for certain products, by copying and pasting show command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco engineer. The TAC Service Request Tool is located at this URL:

http://www.cisco.com/techsupport/servicerequest

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553-2447

For a complete list of Cisco TAC contacts, go to this URL:

http://www.cisco.com/techsupport/contacts

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is “down,” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

14 Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, documentation, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:

  http://www.cisco.com/go/marketplace/

- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:

  http://www.ciscopress.com

- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:

  http://www.cisco.com/packet

- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:

  http://www.cisco.com/go/iqmagazine

- or view the digital edition at this URL:

  http://ciscoiq.texterity.com/ciscoiq/sample/

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

  http://www.cisco.com/ipj

- Networking products offered by Cisco Systems, as well as customer support services, can be obtained at this URL:

  http://www.cisco.com/en/US/products/index.html

- Networking Professionals Connection is an interactive website for networking professionals to share questions, suggestions, and information about networking products and technologies with Cisco experts and other networking professionals. Join a discussion at this URL:

  http://www.cisco.com/discuss/networking

- World-class networking training is available from Cisco. You can view current offerings at this URL:

  http://www.cisco.com/en/US/learning/index.html

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